

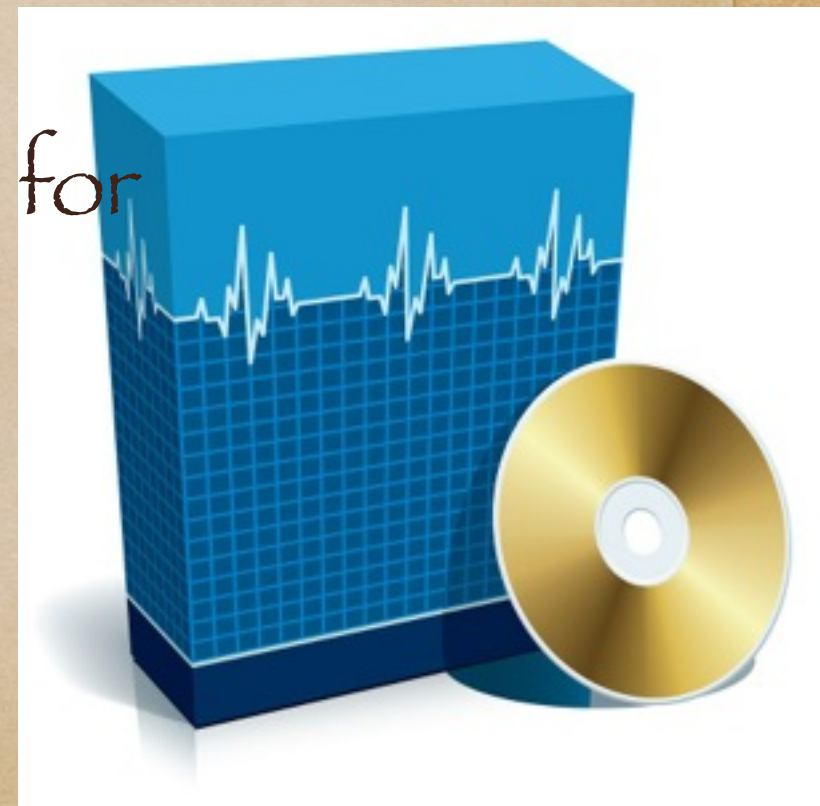
Professional Ethics

Software Engineering Ethics

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What is a software?

- ◆ Software:
 - ◆ Computer programs and
 - ◆ Associated documentation.
- ◆ Software products may be developed for
 - ◆ a particular customer
 - ◆ a general market.



Why Software Engineering?

Problem Specification

Coding



Final Program (SW)

- *But ...*

- ◆ Where did the specification come from?
- ◆ How do you know the specification corresponds to the user's needs?
- ◆ How do you know the program actually meets the specification?
- ◆ How do you know your program will always work correctly?
- ◆ What do you do if the users' needs change?
- ◆ How do you divide tasks up if you have more than a one-person team?

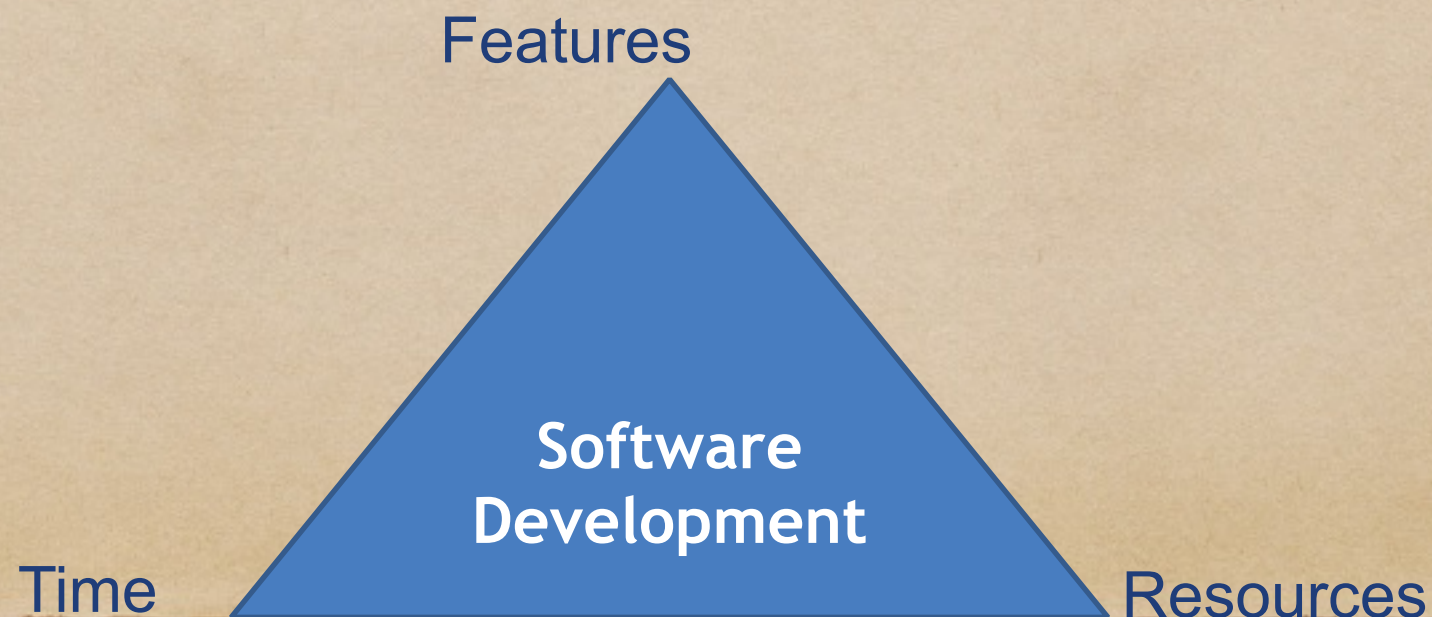
What is Software Engineering?

Software engineering is concerned with **theories, methods and tools** for professional software development.

-Sommerville

State of the art of developing **quality** software **on time** and within **budget**

-Anonymous



What is Software Engineering?

Multi-person construction of **multi-version** software.

Parnas

- ◆ Team-work
 - ◆ Scale issue (“program well” is not enough) + Communication Issue
- ◆ Successful software systems must evolve
 - ◆ Change is the norm, not the exception



What is Software Engineering?

*Everything else, **besides programming**, that contributes to building **efficient** software systems.*

-Anonymous

- ◆ Programming is not enough
- ◆ Every one of you should be able to implement Facebook.
 - ◆ The reason why there is only one Facebook is everything else they did right besides programming.
 - ◆ Plus luck 😊

Software engineering

- ◆ The economies of ALL developed nations are dependent on software. (Is this true?)
- ◆ More and more systems are software controlled (How)
- ◆ Software engineering is concerned with theories, methods and tools for professional software development.

Software costs

- ◆ The costs of software on a PC are often greater than the hardware cost.
- ◆ Software costs more to maintain than it does to develop.
 - ◆ For systems with a long life, maintenance costs may be several times development costs.
- ◆ Software engineering is concerned with cost-effective software development.

Professional and Ethical Responsibility

- ♦ *Software engineering involves **wider** responsibilities **than** simply the application of **technical skills**.*
- ♦ *Software engineers must behave in an **honest** and ethically responsible way if they are to be respected as professionals.*
- ♦ *Ethical behaviour is **more than simply upholding the law**.*

Issues of Professional Responsibility

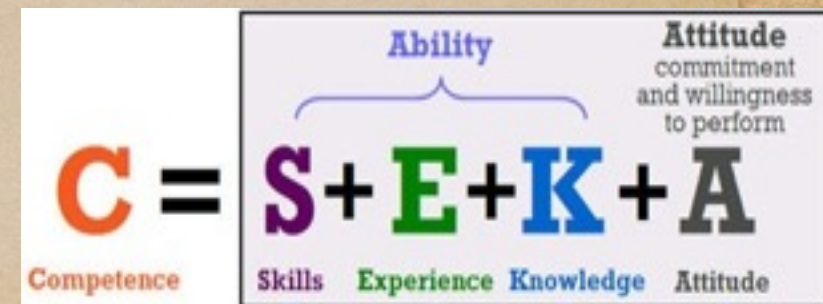
♦ Confidentiality

- ♦ Engineers should normally respect the confidentiality of their *employers* or *clients* irrespective of whether or not a formal confidentiality agreement has been signed.



♦ Competence

- ♦ Engineers should not misrepresent their level of competence.
- ♦ They should not knowingly accept work which is outwith their competence.



Issues of Professional Responsibility

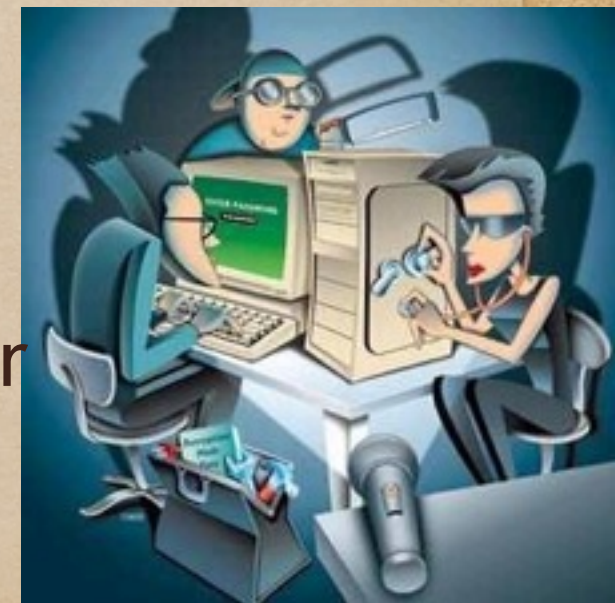
- ♦ *Intellectual property rights*

- ♦ Engineers should be aware of local laws governing the use of intellectual property such as patents, copyright, etc.



- ♦ *Computer misuse*

- ♦ Software engineers should not use their technical skills to misuse other people's computers. Computer misuse ranges from relatively trivial (game playing) to extremely serious (dissemination of viruses).



ACM/IEEE Code of Ethics

- ♦ *The professional societies in the US have cooperated to produce a code of ethical practice.*
 - ♦ IEEE (Institute of Electrical and Electronic Engineering)
 - ♦ ACM (Association for Computing Machinery)
- ♦ *The Code contains eight Principles related to the behaviour of and decisions made by professional software engineers.*

The ACM/IEEE Code of Ethics

Software Engineering Code of Ethics and Professional Practice

ACM/IEEE-CS Joint Task Force on Software Engineering Ethics and Professional Practices

PREAMBLE

The short version of the code summarizes aspirations at a high level of the abstraction; the clauses that are included in the full version give examples and details of how these aspirations change the way we act as software engineering professionals. Without the aspirations, the details can become legalistic and tedious; without the details, the aspirations can become high sounding but empty; together, the aspirations and the details form a cohesive code.

Software engineers shall commit themselves to making the analysis, specification, design, development, testing and maintenance of software a beneficial and respected profession. In accordance with their commitment to the health, safety and welfare of the public, software engineers shall adhere to the following Eight Principles:

Public



Client and Employer



Product



Judgment

CoE Principle #1: Public

♦ *Software engineers shall act consistently with the public interest.*

- ♦ Accept full responsibility for their own work.
- ♦ Approve software only if they have a well-founded belief that
 - ♦ it is safe,
 - ♦ meets specifications,
 - ♦ passes appropriate tests, and
 - ♦ does not diminish quality of life, diminish privacy or harm the environment.

CoE Principle #2: *Client & Employer*

- ♦ *Software engineers shall act in a manner that is in the best interests of their client and employer, consistent with the public interest.*
 - ♦ Provide service in their areas of competence, being honest about any limitations of their experience.
 - ♦ Not knowingly use software that is obtained or retained either illegally or unethically.
 - ♦ Keep private any confidential information gained in their professional work

CoE Principle #3: *Product*

- ♦ *Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.*
 - ♦ strive for high quality, acceptable cost and a reasonable schedule.
 - ♦ Ensure proper and achievable goals and objectives for any project on which they work or propose.
 - ♦ Identify, define and address ethical, economic, cultural, legal and environmental issues related to work projects.

CoE Principle #4: Judgment

- ♦ *SW engineers shall maintain integrity and independence in their professional judgment.*
 - ♦ Only endorse documents either prepared under their supervision or within their areas of competence and with which they are in agreement.
 - ♦ Maintain professional objectivity with respect to any software or related documents they are asked to evaluate.
 - ♦ Not engage in deceptive financial practices such as bribery, double billing, or other improper financial practices.

CoE Principle #5: Management

- ♦ *Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.*
 - ♦ Attract potential software engineers only by full and accurate description of the conditions of employment.
 - ♦ Not ask a software engineer to do anything inconsistent with this Code.
 - ♦ Not punish anyone for expressing ethical concerns about a project.

CoE Principle #6: Profession

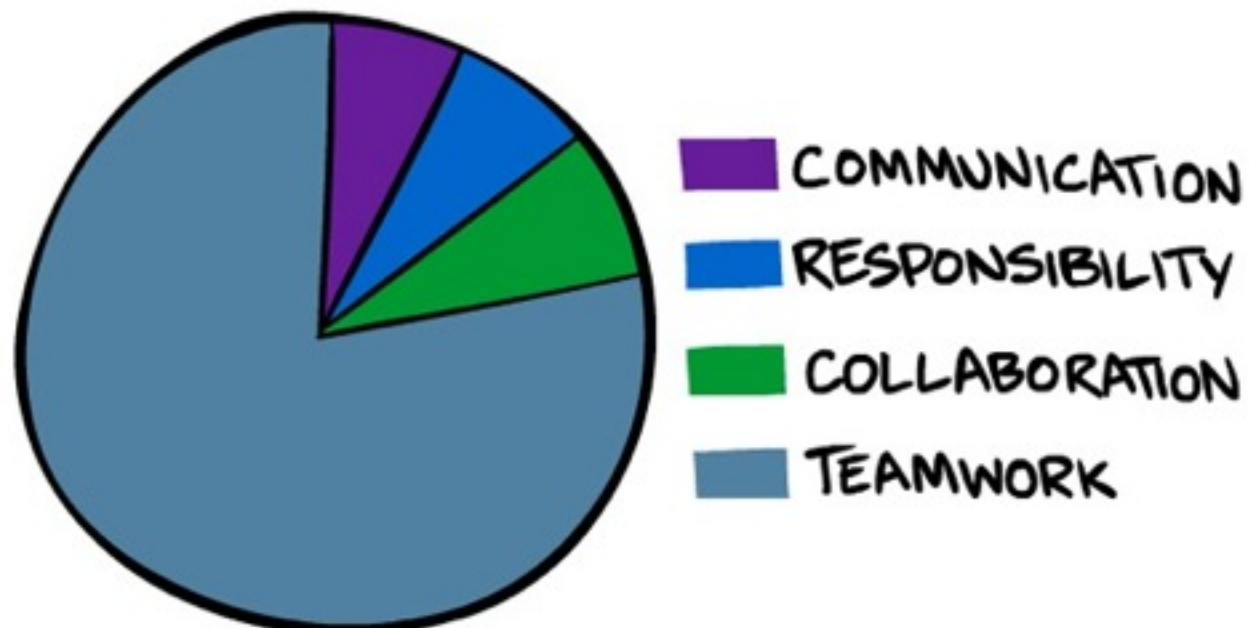
- ♦ *Software engineers shall advance the integrity and reputation of the profession consistent with the public interest*
 - ♦ Help develop an organizational environment favorable to acting ethically.
 - ♦ Promote public knowledge of software engineering.
 - ♦ Extend software engineering knowledge by appropriate participation in professional organizations, meetings and publications.

CoE Principle #7: Colleagues

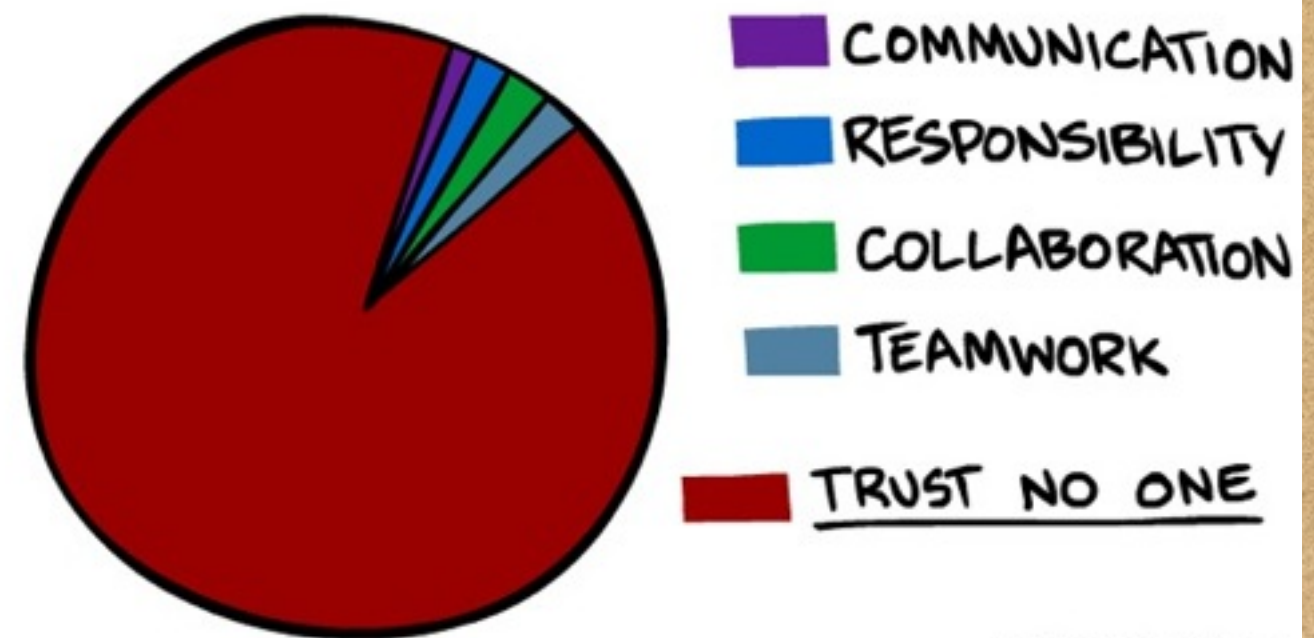
- ♦ *Software engineers shall be fair to and supportive of their colleagues.*
 - ♦ Encourage colleagues to adhere to this Code.
 - ♦ Assist colleagues in professional development.
 - ♦ Credit fully the work of others
 - ♦ Review the work of others in an objective, and properly-documented way.

CoE Principle #7: Colleagues

WHAT GROUP PROJECTS ARE SUPPOSED TO TEACH YOU



WHAT GROUP PROJECTS TAUGHT ME



CoE Principle #8: Self

- ♦ *Software engineers shall participate in life-long learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.*
 - ♦ Further their knowledge of developments
 - ♦ Improve their ability to create safe, reliable, and useful quality software at reasonable cost and within a reasonable time.
 - ♦ Improve their ability to produce accurate, informative, and well-written documentation.

The ACM/IEEE Code of Ethics

Read More ➞